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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/855,321	05/14/2001	Tuomo Suntola	ASMMC.013C2	9994

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EXAMINER

FULLER, ERIC B

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/855,321	SUNTOLA ET AL.	
	Examiner	Art Unit	
	Eric B Fuller	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 7, 2004 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

These claims are drawn to evacuating essentially totally "a volume of gas corresponding to the gas volume of the reaction space". This phrase renders the scope of the claims confusing. Specifically, gas does not have a fixed volume. The volume of the gas is the volume of the container holding the gas. Because of this phenomenon, even as one is evacuating a chamber from a pressure from 1 atm to near vacuum, the volume of the gas in the chamber is exactly the same before and after evacuation. Because a perfect vacuum cannot exist on earth,

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no matter how much gas is removed, "a volume of gas corresponding to the gas volume of the reaction space" cannot ever be essentially totally evacuated from the chamber because the gas volume of the chamber remains constant during the evacuation process. Since the claims are drawn to evacuating volumes of gas, and not an amount of gas, the scopes of the claims are confusing. Unless a perfect vacuum is achieved, the volume of gas in the chamber cannot be changed.

Additionally, "corresponding" is vague and confusing. It appears from the arguments that this is to mean "equal to", or that the "entire" reaction space is evacuated. However, "equal to" and/or "entire" are not used and "corresponding" does not necessarily require such limitations.

The scopes of the dependent claims are additionally confusing because they require 2 or 3-10 gas volumes to be evacuated. Not only are the scopes confusing for the reasons stated above, it is not understood how 3-10 gas volumes are evacuated when the volume in the container remains constant, but the claims lacking a purge gas additionally adds confusion to the claims. How 3-10 volumes are removed is unclear when the claims are open to only 1 volume existing in the chamber. The evacuated gas most likely would be pumped into a much larger container as it is evacuated from the reaction space. Thus, the evacuated gas may have a larger volume than the reaction space as the evacuated gas takes the volume of its new container. Would this read on the applicant's claims?

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17-25 and 32-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishizawa et al. (US 4,975,252) in view of Sakuma et al. (US 5,270,247).

Nishizawa teaches an atomic layer epitaxy process in an ultrahigh vacuum (column 4, lines 15-47). Between reactant pulses, the reaction space is evacuated. The reference is silent to "essentially totally" evacuating the chamber. Although the large pressure changes between the reactant pulses and the evacuating pulses would seem to indicate essentially totally evacuating the entire volume of the reaction space, the examiner provides Sakuma for teaching that it is desirable to separate the different gases as completely as possible (column 5, lines 30-35). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to evacuate the chamber essentially totally. By doing so, one would reap the benefits of separating the gases as completely as possible.

Additionally, Sakuma teaches that purge gas allows for more separation between the gases and the amount of purge gas is taught (column 5, lines 30-60). To utilize a purge gas would have been obvious at the time the invention

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was made to a person having ordinary skill in the art. By doing so, the separation of gases is made even more complete. Evacuating the reactant and purge gases is sufficient for reading on applicant's dependant claims. How Sakuma meets all the other limitations has been discussed in the previous Office Action.

Claims 26-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishizawa et al. (US 4,975,252) in view of Sakuma et al. (US 5,270,247), as applied to claim 17 above, and further in view of Moore, Sr. (US 3,662,583).

Nishizawa, in view of Sakuma, teaches the limitations to claim 17, but is silent to the use of oblong feed pipes. However, Moore teaches that using oblong feed types for feed a process space provides a wider spread of feed gas, such that the process space may be reduced. One of skill in the art would recognize that a smaller process space would result in less feed gas and process/evacuation times required. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize oblong feed pipes in the processes of Nishizawa, in view of Sakuma. By doing so, the volume of the process chamber may be reduced, resulting in less feed gas required and smaller process/evacuation times.

Response to Arguments

Applicant argues that Sakuma does not teach evacuating the entire volume of the chamber between pulses, as a standing wave of reactant/purge

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pulses may exist. This argument has been found convincing, especially in view of the amendments filed. The examiner has withdrawn the rejections of the previous Office Action, accordingly. Applicant's arguments are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B Fuller whose telephone number is (571) 272-1420. The examiner can normally be reached on Mondays through Thursdays.

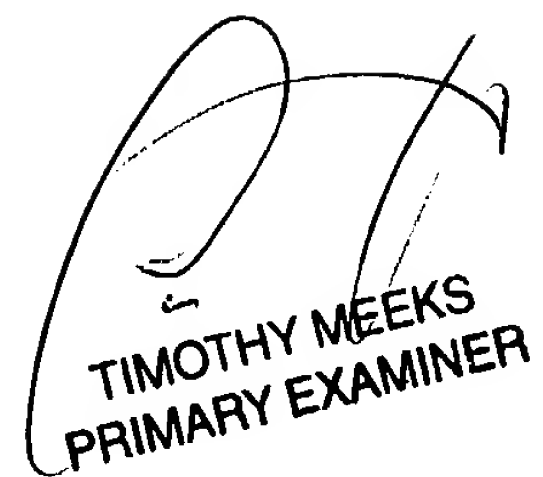
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck, can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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EBF



TIMOTHY MEEKS
PRIMARY EXAMINER